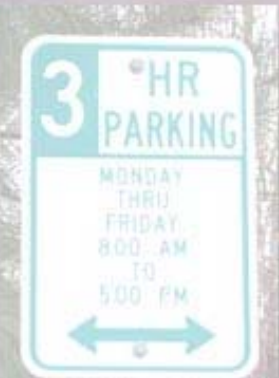




## Municipal and School



## Transportation Assistance





# Who is MSTA?

Municipal & School Transportation Assistance (MSTA) provides traffic engineering assistance through the performance of comprehensive transportation studies to North Carolina schools, state agencies, and municipalities under 50,000 in population that do not have a traffic engineering staff.



Steve Epley

# **MSTA School Traffic Calculator and**

## **MUTCD, Part 7**

**Traffic Controls for School Areas**

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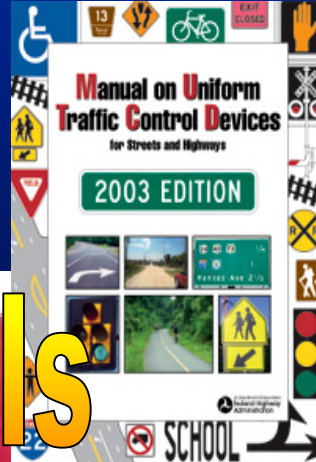
**An insight to School Facilities,  
Guidelines to provide better traffic operations**



# Do Schools have Traffic Concerns?



# What is available to help with School Traffic?



## Manuals

## MSTA Staff



School Name: Your County School  
Is this a PUBLIC school? Yes

MSTA School Queue Input

Type School	Student Population	Number of Buses	Faculty Members	Student Drivers	PM Total Number of Vehicles	PM Maximum Vehicles	Required Queue Length	Total AM Trips	Total PM Trips
Elementary	800	10	30		131	60	1323	685	272
High School	1400	25	100	450	65	74	1673	812	304
AM High Trips									
PM High Trips									
AM Elementary Trips									
PM Elementary Trips									

Middle School Data

Direction	Parents	Buses	Faculty	Trips	Parents	Buses	Faculty	Trips
IN	138	25	135	450	65			
OUT	138				65	25		
AM High Trips								
PM High Trips								
Total All AM Trips								
Total All PM Trips								

ADT: 957

Version: 6172003

## MSTA School Calculator



# School Transportation Issues

School Name: Your County School										Version:		6/27/2003	
Is this a PUBLIC school? <b>Yes</b>													
MSTA School Queue Input										Calculations			
Type School	Student Population	Number of Buses	Faculty Members	Student Drivers	PM Total Number of Vehicles	PM Maximum Vehicles	Required Queue Length	Total AM Trips	Total PM Trips				
Elementary	800	10	90		131	60	1323	685	272				
Middle	1000	20	100		142	74	1673	812	304				
High	1500	25	135	450	65	36	884	886	605				
								2383	1181				
Elementary School Data													
AM Trips Generated					PM Trips Generated								
Direction	Parents	Buses	Faculty	Trips	Parents	Buses	Faculty	Trips					
IN	233	10	90	393	131			131					
OUT	233			233	131	10		141					
AM Elementary Trips				685	PM Elementary Trips				272				
Middle School Data													
AM Trips Generated					PM Trips Generated								
Direction	Parents	Buses	Faculty	Trips	Parents	Buses	Faculty	Trips					
IN	346	20	100	466	142			142					
OUT	346			346	142	20		162					
AM Middle Trips				812	PM Middle Trips				304				
High School Data													
AM Trips Generated					PM Trips Generated								
Direction	Parents	Buses	Faculty	Student Drivers	Trips	Parents	Buses	Faculty	Student Drivers	Trips			
IN	138	25	135	450	748	65				65			
OUT	138				138	65	25		450	540			
AM High Trips				886	PM High Trips				605				
Total All AM Trips				In 1606 Out 776 Total 2383	Total All PM Trips				In 338 Out 843 Total 1181				

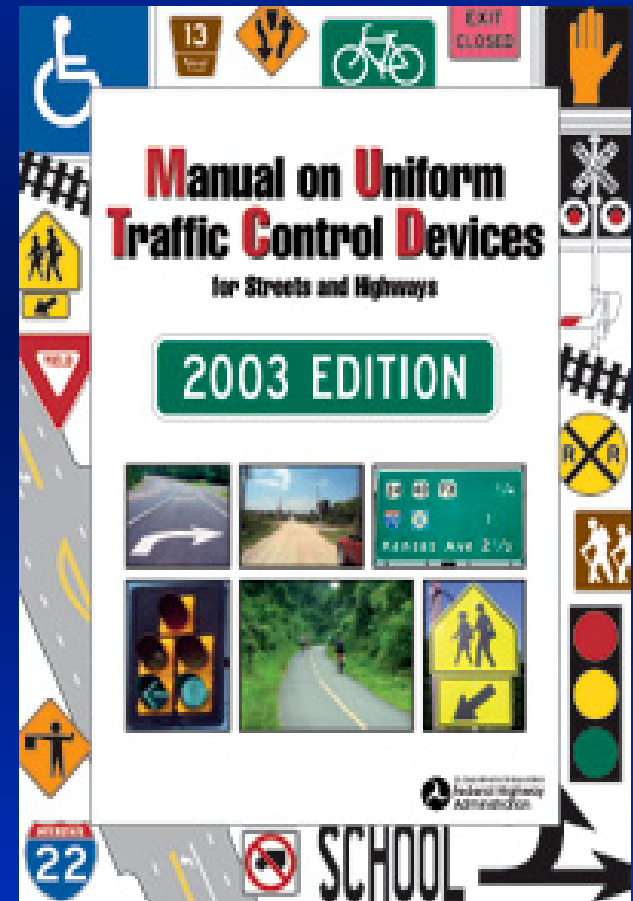
ak traffic for normally take minutes.

ADT 957

1116

1431

3564



# The Most Accurate School Traffic Calculator In The World!

Provided by MSTA  
as a engineering tool  
to help reduce school related  
traffic congestion



# Municipal and School



## Transportation Assistance

# School Traffic Calculator

School Name: Your County School  
Is this a PUBLIC school? **Yes** Version: 6172003

MSTA School Queue Input					Calculations				
Type School	Student Population	Number of Buses	Faculty Members	Student Drivers	PM Total Number of Vehicles	PM Maximum Vehicles	Required Queue Length	Total AM Trips	Total PM Trips
Elementary	800	10	90		131	60	1323	685	272
Middle	1000	20	100		142	74	1673	812	304
High	1500	25	135	450	65	36	884	886	605
								2383	1181

Elementary School Data									
AM Trips Generated					PM Trips Generated				
Direction	Parents	Buses	Faculty	Trips	Parents	Buses	Faculty	Trips	
IN	293	10	90	393	131			131	
OUT	293			293	131	10		141	
AM Elementary Trips				685	PM Elementary Trips				272

Middle School Data									
AM Trips Generated					PM Trips Generated				
Direction	Parents	Buses	Faculty	Trips	Parents	Buses	Faculty	Trips	
IN	346	20	100	466	142			142	
OUT	346			346	142	20		162	
AM Middle Trips				812	PM Middle Trips				304

High School Data											
AM Trips Generated					PM Trips Generated						
Direction	Parents	Buses	Faculty	Student Drivers	Trips	Parents	Buses	Faculty	Student Drivers	Trips	
IN	138	25	135	450	748	65				65	
OUT	138				138	65	25		450	540	
AM High Trips					886	PM High Trips					605
Total All AM Trips						Total All PM Trips					
					In	In					
					Out	Out					
					Total	Total					
					1606	338					
					776	843					
					2383	1181					

Peak traffic for normally take minutes.

ADT 957

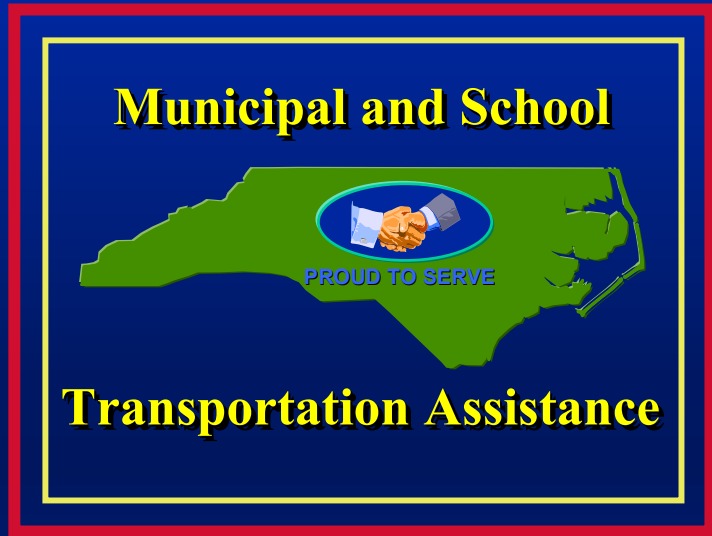
1116

1491

3564



# Where is this information?



[www.ncdot.org/~msta](http://www.ncdot.org/~msta)



[www.itre.ncsu.edu/stg](http://www.itre.ncsu.edu/stg)

(School Transportation Group)

Institute for Transportation Research and Education  
at North Carolina State University

# MSTA School Traffic Calculator

## Purpose

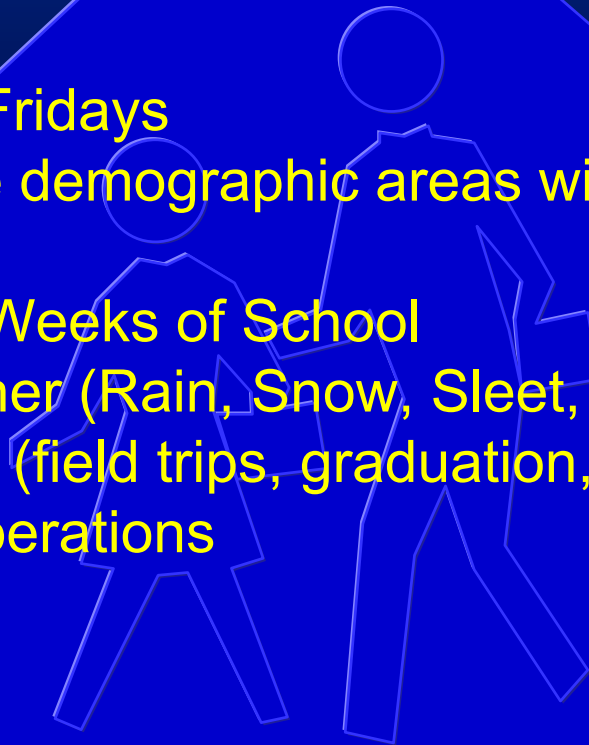
- Provide a conservative engineering analysis tool for estimating traffic volumes and storage lengths at public and private schools across North Carolina.
- Help determine safe and effective low cost traffic solutions by applying basic traffic engineering principals.

# MSTA School Traffic Calculator

## Limitations

Provides minimum average traffic counts with no adjustments for:

- Mondays and Fridays
- Above average demographic areas with high carpool demands
- First and Last Weeks of School
- Adverse Weather (Rain, Snow, Sleet, Fog)
- Special Events (field trips, graduation, sports, etc...)
- Poor Traffic Operations

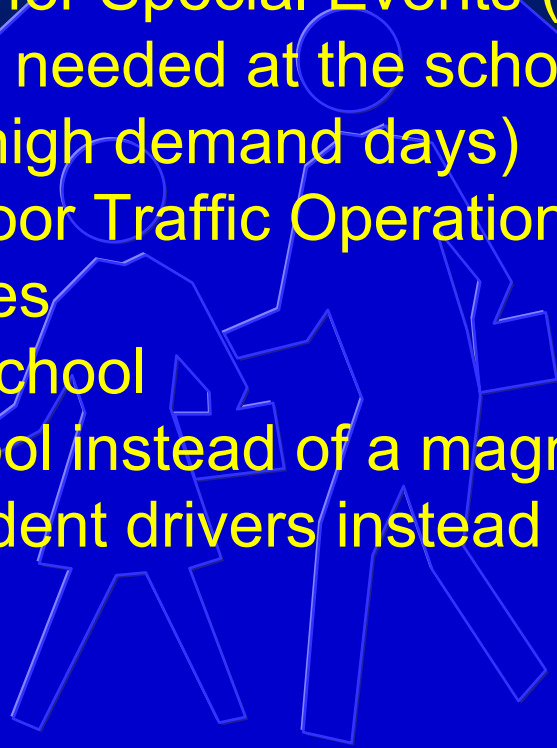




# MSTA School Traffic Calculator

## Common Misuses

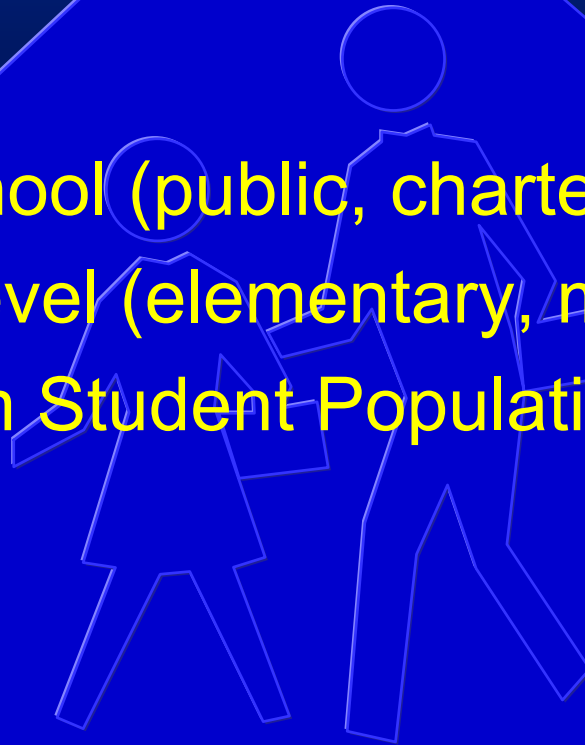
- Trip Generation for Special Events (Football Games)
- Maximum traffic needed at the school  
(no plans for high demand days)
- Treatment for poor Traffic Operations
- Daycare Facilities
- Wrong type of school  
(A public school instead of a magnet school)
- High school student drivers instead of “Carpool” storage



# How do I use the School Traffic Calculator?

You first must know this information.

- Type School (public, charter, private)
- Grade Level (elementary, middle, high)
- Maximum Student Population





Version: 3092004

ADT

ADT


\_\_\_\_\_

100

\_\_\_\_\_

100

\_\_\_\_\_



Microsoft Excel - School Calculator 2002.xls

File Edit View Insert Format Tools Data Window Help

Arial 10 B I U

V48

DO NOT SAVE CHANGES TO THIS SHEET! / ENTER NUMBERS IN WHITE SPACES ONLY!

School Name: Your Elementary School

Is this a PUBLIC school? **Yes** Version: 3092004

MSTA School Queue Input					Calculations				
Type School	Student Population	Number of Buses	Faculty Members	Student Drivers	PM Total Number of Vehicles	PM Maximum Vehicles	Required Queue Length	Total AM Trips	Total PM Trips
Elementary	600	8	75						
Middle									
High									

AM Cars / Student 36.56% PM Cars / Student 16.31% Avg. Car Length 22.19 PM At one Time 45.50%

Private School school data is based on no buses and uses the same percentages for all school types (elementary, middle, & high).

Elementary School Data			
Direction	Parents	Buses	Faculty
IN			
OUT			

Middle School Data			
Direction	Parents	Buses	Faculty
IN			
OUT			

Type School	Student Population	Number of Buses	Faculty Members
Elementary	600	8	75
Middle			

NOTE: Traffic school place

Peak-Hour Traffic Volumes			
Roadway ADT	15% of ADT	Major Direction	Minor Direction
15000	2250	1350	900

AASHTO 2001: On rural roads with average fluctuation in traffic flow, the 30th highest hourly volume is typically 15 percent of the ADT.

Instructions Calculator G5 136-18

Public School, Elementary, 600 Students, 8 buses, 75 faculty

Microsoft Excel - School Calculator 2002.xls

File Edit View Insert Format Tools Data Window Help

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V48

DO NOT SAVE CHANGES TO THIS SHEET! / ENTER NUMBERS IN WHITE SPACES ONLY!

School Name: Your Elementary School  
Is this a PUBLIC school? **Yes** Version: 3092004

MSTA School Queue Input					Calculations				
Type School	Student Population	Number of Buses	Faculty Members	Student Drivers	PM Total Number of Vehicles	PM Maximum Vehicles	Required Queue Length	Total AM Trips	Total PM Trips
Elementary	600	8	75		98	45	989	522	204
Middle									
High									
							989	522	204

AM Cars / Student 36.56% PM Cars / Student 16.31% Avg. Car Length 22.19 PM At one Time 45.50%

Private School school data is based on no buses and uses the same percentages for all school types (elementary, middle, & high).

Elementary School Data							
AM Trips Generated							
Direction	Parents	Buses	Faculty	Trips	Parents	Buses	Faculty
IN	219	8	75	302	98		
OUT	219			219	98		
AM Elementary Trips				522	PM Elementary Trips		
					204		

Middle School Data							
AM Trips Generated							
Direction	Parents	Buses	Faculty	Trips	Parents	Buses	Faculty
PM Middle Trips					PM High Trips		
					Total All PM Trips		
					In 98		
					Out 106		
					Total 204		

Calculations				
Maximum Vehicles	Required Queue Length	Total AM Trips	Total PM Trips	ADT
	989	522	204	726

NOTE: Traffic volumes reflect peak school operations which normally occur in place in approximately 30 minutes.

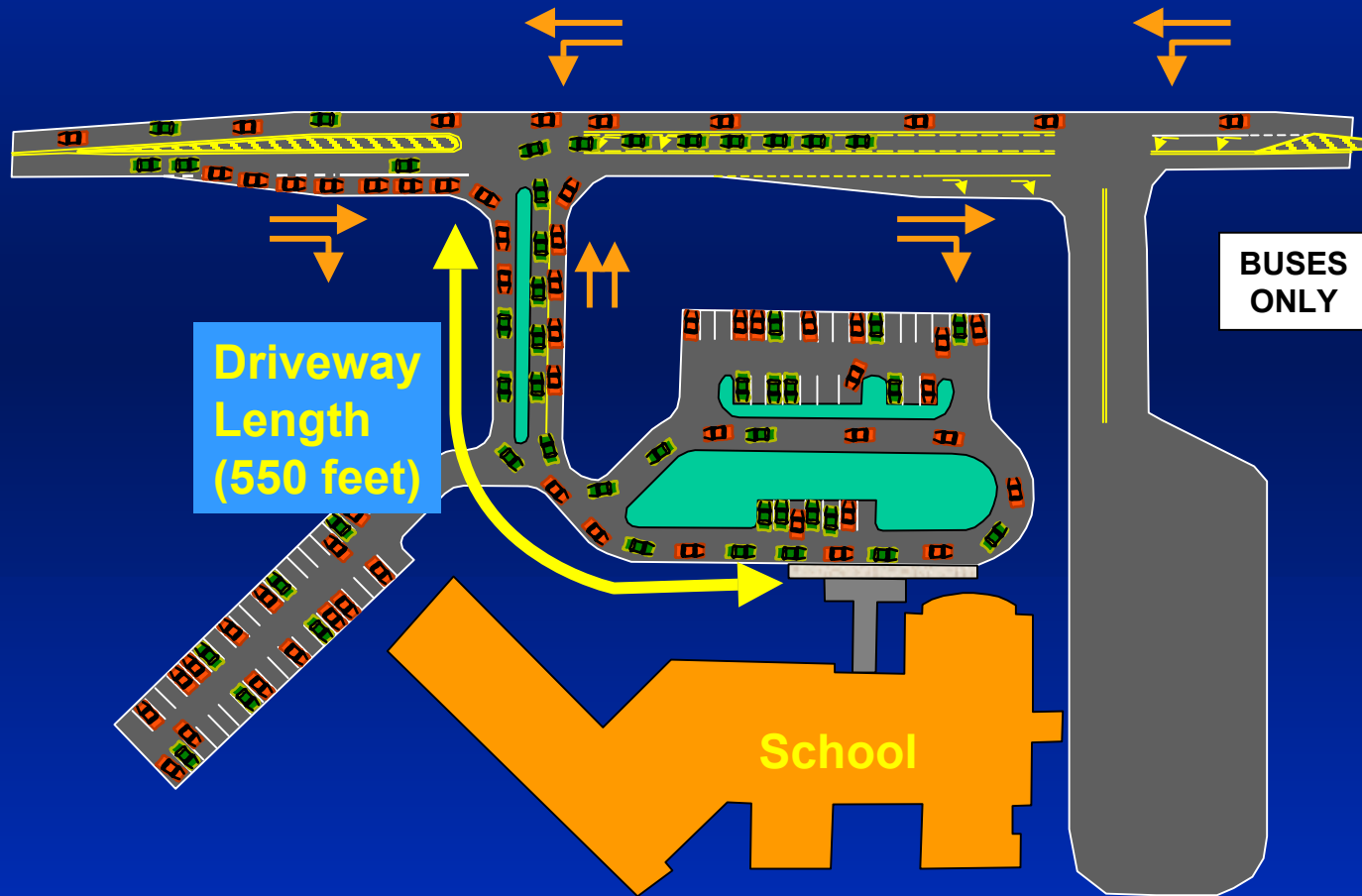
Roadway ADT	15% of ADT	Major Direction	Minor Direction
15000	2250	1350	900

AASHTO 2001: On rural roads with average fluctuation in traffic flow, the 30th highest hourly volume is typically 15 percent of the ADT.

Instructions Calculator G5 136-18

Required Queue Length of 989 feet (Trips: 522 AM, 204 PM)

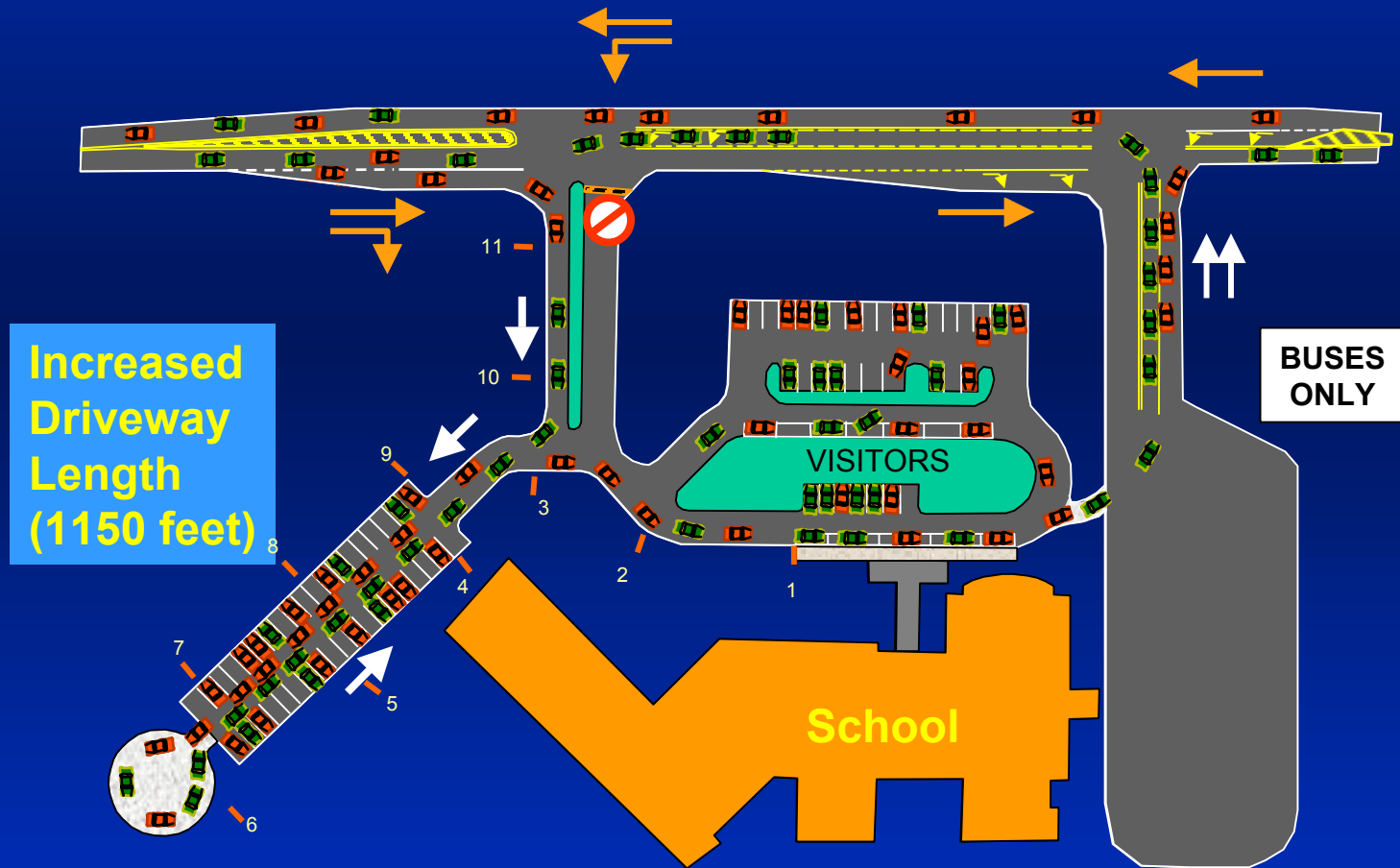
# EXAMPLE



Required Queue Length of 1000 feet (Trips: 522 am, 204 pm)



# EXAMPLE



Required Queue Length of 1000 feet (Trips: 522 am, 204 pm)

**Municipal and School**



**Transportation Assistance**

**and You**

**Working Together**

**To Provide  
Safe Roads to Schools**